

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
20 October 2005 (20.10.2005)

PCT

(10) International Publication Number  
**WO 2005/097821 A1**

(51) International Patent Classification<sup>7</sup>: **C07K 14/025**

(21) International Application Number:  
PCT/US2005/009199

(22) International Filing Date: 18 March 2005 (18.03.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/555,926 24 March 2004 (24.03.2004) US

(71) Applicant (for all designated States except US): **MERCK & CO., INC.** [US/US]; 126 East Lincoln Avenue, Rahway, NJ 07065-0907 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **BRYAN, Janine, T.** [US/US]; 126 East Lincoln Avenue, Rahway, NJ 07065-0907 (US). **BROWNLOW, Michelle, K.** [US/US]; 126 East Lincoln Avenue, Rahway, NJ 07065-0907 (US).

**SCHULTZ, Loren, D.** [US/US]; 126 East Lincoln Avenue, Rahway, NJ 07065-0907 (US). **JANSEN, Kathrin, U.** [DE/US]; 126 East Lincoln Avenue, Rahway, NJ 07065-0907 (US).

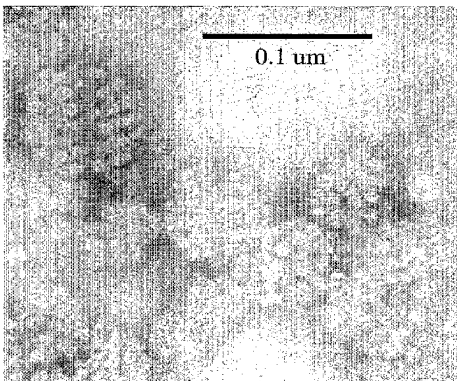
(74) Common Representative: **MERCK & CO., INC.**; 126 East Lincoln Avenue, Rahway, NJ 07065-0907 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,

[Continued on next page]

(54) Title: OPTIMIZED EXPRESSION OF HPV 52 L1 IN YEAST



(57) Abstract: Synthetic DNA molecules encoding the HPV 52 L1 protein are provided. Specifically, the present invention provides polynucleotides encoding HPV 52 L1 protein, wherein said polynucleotides are codon-optimized for high level expression in a yeast cell. In alternative embodiments of the invention, the nucleotide sequence of the synthetic molecule is altered to eliminate transcription termination signals that are recognized by yeast. The synthetic molecules may be used to produce HPV 52 virus-like particles (VLPs), and to produce vaccines and pharmaceutical compositions comprising the HPV 52 VLPs. The vaccines of the present invention provide effective immunoprophylaxis against papillomavirus infection through neutralizing antibody and cell-mediated immunity and may also be useful for treatment of existing HPV infections.

WO 2005/097821 A1



FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,  
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,  
GQ, GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the  
claims and to be republished in the event of receipt of  
amendments*

**Published:**

— *with international search report*

*For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.*